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HEALTH AND SOCIOECONOMIC ANALYSIS OF WASTE PICKING ACTIVITIES IN ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, DURBAN

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Abstract:
The main aim of this study was to unpack the health and socioeconomic status of waste-picking activities in Mayville, Cato Manor, and Westville in Durban. It analyzed the quality of life of waste pickers, their awareness of the risks associated with this kind of work, and the extent of their uptake of health-protective measures. A quantitative approach was adopted, and a questionnaire was used to gather data from 81 waste pickers. The findings revealed that unemployment was the main reason for taking up waste picking and that this was the respondents' primary source of income. It was also found that most respondents resided in shacks and had no access to running water. Most were unaware of the risks associated with this kind of work. Based on these findings, it is recommended that economic development be pursued to create employment opportunities and that delivery of essential services such as potable water be improved, especially in informal settlements. Awareness campaigns should be launched to educate waste pickers on handling waste, the risks associated with this kind of work, and the need to adopt protective health measures. Finally, the researcher recommends further research on waste picking in Durban as there is a paucity of information on this activity in the city.

Keywords: Waste Pickers, Socioeconomic, Health, Recycling

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INTRODUCTION

Discourse on waste-picking activities has increased, especially in the global south. According to Parihar et al. (2017), as far back as 2500BC, waste disposal was the subject of much attention in the towns of Babylon and Assyria. The plague outbreak in the 14th century, which was exacerbated by urbanization and industrialization brought about by progress in human civilization, Parihar et al. (2017) highlighted the need to manage waste. Rahman et al. (2017) note that the more recent systems developed in the 1960s provided more efficient ways of dealing with solid waste, and the collection and removal of waste became a critical factor in solid waste management. It led to the emergence of recycling activities and businesses worldwide, some of which have produced millionaire entrepreneurs (Yaacob et al., 2016; Akinbola et al., 2015). Countries like Indonesia have leveraged recycling to foster community empowerment projects and alleviate poverty (Hadiyanti, 2016). Waste pickers have also started to organize. The first World Conference of Waste Pickers and the Third Latin American Conference of Waste Pickers were held in 2008, while Columbia launched a National Day commemorating waste pickers in the same year. According to Yang et al. (2017), worldwide, 15 million people are involved in informal recycling activities. Yang et al. (2017) add

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that collaboration among informal and formal paper recycling stakeholders has borne fruit in many Latin American countries and that recycling has proven effective in waste management and poverty reduction. Rahman et al. (2017) note that recycling systematically re-usages, reduces, and manages waste, with waste pickers at the beginning of the recycling value chain.

According to Van Zeeland (2014), waste pickers' organizations were founded during the 1980s and 1990s with the support of Non-Governmental Organizations (NGOs). A national movement was launched at the first national meeting of waste pickers in Brazil in 1991, and this profession was recognized by the state in 2002. Van Zeeland (2014) notes that this was due to waste pickers' collective action, which demonstrated their positive influence on public policies. Since then, many national waste pickers' movements have been launched in Kenya and South Africa. Waste pickers' cooperatives have secured contracts from municipalities to undertake aspects of solid waste management, and in some cases, community-based approaches to solid waste management have been developed (Rigasa et al., 2016). Both cooperatives and community-based approaches generate an income for waste sorters.

In the cities of developing countries, it is now the norm to see women and men sharing the roads with vehicles. Some carry their pickings on their heads, while others push trolleys. Waste pickers are seen sifting through the bins in complexes and rubbish bags placed on the street, while others focus on industrial areas and landfills. From their outward appearance, one can tell that all is not well with these people, referred to as 'scavengers,' 'waste harvesters,' 'waste pickers,' and 'amaphanda' in isiZulu. The researcher's observations led to the conclusion that there is more to this activity than simply collecting waste material, which sparked her interest in investigating this phenomenon.

Many factors push people into different activities to make a living, especially in the informal sector. Poverty and unemployment are among the factors that drive people into informal activities such as waste picking for recycling. The state does not regulate informal trading; hence, informal traders do not pay taxes. While the literature notes the relevance and importance of waste pickers and subsequent recycling (see, for instance, Yang et al., 2017 and Rahman et al., 2017), there is a paucity of research on how waste pickers contribute to the welfare of their families in the South African context. Furthermore, debate continues on the socioeconomic and environmental effects of trading in waste by informal waste pickers. Globalization, industrialization, and modernization have transformed developing countries, but many still need help to adjust to the new order. At the local level, waste management systems in developing countries could be more reliable and more small-scale. It has paved the way for community members to turn waste into a valuable resource. Madsen (2005) observes that three principles should underlie waste management in developing countries, namely, (i) waste to become wealth, (ii) refuse to become a resource, and (iii) trash to become cash.

Waste picking is a vital means of survival for the impoverished in various countries. Waste pickers also contribute significantly in areas with inadequate and inefficient waste management. (Madsen, 2005; Medina, 2008). The World Bank notes that poverty levels remain high globally, although meaningful progress has been made since adopting the Millennium Development Goals (MDGs) (World Bank Group, 2017). Scholars around the world have debated the relationship between poverty and inequality. A study conducted in Central and North African countries concluded that inequality fuels poverty in Africa (Ncube et al., 2014).

Dealing with waste, be it collection or management, is the responsibility of local government (municipalities). Due to their lack of resources, garbage lines the streets of many cities in developing countries. Yigit (2015) asserts that recycling enables waste pickers and their families to survive and benefits communities, municipalities, and the environment. Hence, the state should recognize and

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value waste pickers in its policy formulation. While waste-picking activities in cities contribute to poverty alleviation, they also pose risks, as many waste pickers are unaware of the health hazards of this trade (Rahman et al., 2017). Yang et al. (2017) argue that poor regulation of recycling activities or lack thereof and using primitive recycling methods create environmental and health hazards that have other socioeconomic and environmental consequences.

There has been a significant increase in women scavenging in bins and refuse around the complexes and streets in Durban. Few of these women, who often pick solid waste such as cardboard and paper, wear protective clothing. Of late, men have also joined this waste-picking business. The waste pickers collect waste paper and sell it to recycling companies, which buy it on the streets of Durban townships and suburbs. Most studies in this field have focused on recycling businesses. To the researcher's knowledge, studies have yet to investigate how the waste pickers benefit from these activities and what challenges and opportunities they face in their economic endeavor. Unemployment in South Africa increased from 4.4 million in 2003 to 5.7 million in 2016 (Stats SA, 2017), and it has yet to be established how many of the unemployed have turned to waste picking to survive. Moreover, their contribution to the local economy needs to be clarified. The main aim of this study was to unpack the health and socioeconomic status of waste pickers in South Africa.

Literature Review. Two contemporary theories were identified for the study: the economic, political, and social distortions theory (the discrimination theory) and the geographical disparity theory. The economic, political, and social distortions or discrimination theory was developed by Bradshaw (2007) to explain the origins and causes of poverty. It posits that poor people are often marginalized and vulnerable because of their situation. In turn, they are excluded from resource allocations or receive less than others because they are powerless and voiceless (Bradshaw, 2013; Viljoen, 2014). People with low incomes are also excluded from decision-making and political structures and thus cannot express their views on matters that concern them. Bradshaw (2013) identifies gender, race, religion, disability, and occupation as other factors that lead to people experiencing poverty. The economic, political, and social distortions theory links with the common belief and existing discourse that waste pickers are marginalized and economically and socially excluded, which makes them vulnerable to poverty (Viljoen, 2014). It underpins most of the current study's research objectives and questions, as the informal sector in which waste pickers operate is characterized by economic, political, and social instability.

The geographical disparity theory was proposed by Morrill and Wohlenberg in 1971 and was recently popularized by the Economic Commission for Latin America and the Caribbean (ECLAC, 2014). It states that factors like unemployment, poverty, and economic and political instability push people to migrate to different geographical areas for better economic opportunities. In other words, migrants move to less poverty-stricken areas than their existing location. The geographical disparity could be rural to urban, national or international. The theory asserts that it occurs due to disinvestment, lack of capital, or innovation in a geographical area, leading to migration (Morrill & Wohlenberg, 1971). People who migrate to different places are unemployable in the formal sectors for different reasons. Some of these reasons could be a lack of documents or skills. As a sequence, they end up delving into the waste-picking business as a source of income. This theory was chosen for the study because people who migrate due to push factors often work in the informal waste-picking industry when they cannot find jobs in the formal sector.

The challenges confronting underdeveloped and developing countries have resulted in the growth of large informal economies that often outstrip the formal economy in size. Since the formal sector cannot accommodate all seeking employment, many people in these countries survive by engaging in informal activities. Waste picking and separating is the first step in recycling and a critical phase. Waste pickers who retrieve material that others no longer want or are of no further

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use to them are called scavengers (Downs & Medina, 2000). This activity is unregistered and unregulated. Downs and Medina (2000) note that scavenging is familiar and occurs even in well-developed countries. They add that it is due to political instability and economic crises. Downs and Medina (2000) cite the examples of America during the Great Depression, when unemployed people survived by collecting metal and other scrap, and Mexico after the peso devaluation. They conclude that scavengers are essential mediators between societies and their environment.

South Africa is home to a vast unskilled labor force that needs help finding employment in the formal sector. Waste picking does not require qualifications or training; people determine their salaries based on effort and work hours (Blaauw et al., 2015). Blaauw et al. (2015) note that it is easy to enter this industry without barriers or requirements. It is estimated that there are 35-70,000 waste pickers in South Africa (Blaauw et al., 2015). Waste picking refers to the removal of recyclable material from mixed waste. Torun et al. (2006) note that this is an informal activity. Waste pickers sort and add value to things rejected as valueless and useless. According to Torun et al. (2006), it has positive social, environmental, and economic effects regardless of the social status attached to informal waste picking and its impact on waste pickers' well-being. It provides employment and a livelihood for impoverished, marginalized, and vulnerable individuals or social groups. While it was projected that the South African economy would grow at a rate of 5% per annum over the past five years, the actual growth rate was less than 3.2% per annum; this is inadequate to absorb the labor supply (Finn et al., 2014). Furthermore, lower growth rates discourage investment, undermining the possibility of creating more jobs.

Nzeadibe (2009) observes that, while waste picking is not covered by a separate Sustainable Development Goal (SDG), it significantly contributes to achieving the SDGs as it assists in poverty reduction, improves livelihoods, creates employment, and enhances environmental sustainability. For example, Nzeadibe (2009) found that informal waste management had a positive economic and environmental impact in Enugu State in Nigeria. It should thus be incorporated into global and local policies. Climate change is a primary global concern, and waste picking assists in addressing this issue, thus promoting environmental sustainability (Forrest & Tuwizana, 2012), especially in developing countries. Moreover, it is a survival strategy for many in such countries.

Various perspectives were considered in developing the SDGs. Harris (2000) highlights the three perspectives of economic, ecological, and social paradigms. He argues that sustainable development must address social inequality and environmental damage while preserving a sound economic base. One of the significant lessons learned from the formulation of the SDGs was the broad representation and consultation process to promote meaningful grassroots participation. The SDGs meant to be achieved by 2030 include several targets relevant to waste pickers. Gupta and Vegelin (2016) note that Goal 1 aims to eradicate poverty in all its forms, Goal 2 is to do away with hunger and malnutrition, and Goal 3 aims to enhance wellbeing and healthy lives. Waste picking can contribute to realizing all three of these goals. It should thus be accorded adequate attention by states when planning and implementing policies to achieve the SDGs.

Rifat et al. (2016) note that migration from rural to urban areas has resulted in Dhaka in India having the world's 11th largest population. Since most migrants do not have the skills to perform formal jobs, they engage in waste picking (Rifat et al., 2016). Rifat et al. (2016) add that poor municipal planning and unreliable services lead to waste being mismanaged, causing diseases, environmental contamination, flooding, and fires (Rifat et al., 2016). The waste-picking business is a hazardous occupation as those who collect trash from tall buildings are forbidden to use the elevators and must make their way to the staircases (Rifat et al., 2016). Rifat et al. (2016) estimate that waste pickers in Dhaka cover around 300 to 500 houses a day and sell their wares daily because of a lack of storage facilities and to avoid contracting diseases by keeping trash. A positive aspect is that

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these waste pickers communicate well with community members as they whistle to alert people to put their rubbish out for collection (Rifat et al., 2016).

Firdaus and Ahmad (2010) observe that increased economic activity due to development and changes in consumption patterns have significantly increased the amount of waste generated and that local governments' waste management systems need to be more robust and unscientific. Firdaus and Ahmad (2010) thus recommend that the relevant stakeholders work together to manage waste. These include grassroots community members most affected by waste, NGOs, local government, the private sector, and others (Firdaus & Almad, 2010). Grant and Ababio (2012) note that, in every developing country, a fraction of the population relies on the waste generated by their wealthy neighbors. Urbanization is a place in developing countries, with many experiencing reasonably rapid economic growth. In China, urbanization has significantly increased the amount of solid waste generated (Fei et al., 2016). Integrating informal recyclers into municipal solid waste management in the Philippines proved extremely fruitful (Paul et al., 2012). The informal waste-picking business has advantages and disadvantages. The advantages include economic, environmental, and financial benefits, while health and social risks are among the disadvantages (Wilson et al., 2006). Wilson et al. (2006) note that many urban populations rely on recycling material for survival. They thus argue that strategies need to be formulated to ensure that this informal business improves the standard of living of those involved and that effective recycling takes place.

It is estimated that there are around 35-70,000 waste pickers in South Africa (Blaauw et al., 2015). Yang et al. (2017) note that about 15 million waste pickers are globally involved in sorting, collecting, and reusing waste. Interestingly, Yang et al. (2017) note that integrating Latin America's informal and formal waste sectors produced positive results, suggesting that this model could be replicated in other developing countries. Many developing countries suffer high illiteracy levels and poor education systems, resulting in a poverty trap. Studies have shown a positive relationship between education, the quality of education, and reduced poverty and income inequality, especially in South Africa (Graven, 2014; Spaul, 2014; 2015; Timæus et al., 2013).

While men and children are involved in waste-picking activities, Yang et al. (2017) note that most waste pickers are women. Women and children are the most marginalized in many societies. Furthermore, women's voices are not heard due to gender inequality. Madsen (2005) proposes that women and children waste pickers should be empowered through economic and entrepreneurial programs and that recycling schools should be established for waste pickers to acquire skills. It would contribute to economic development, help address poverty, and enhance environmental sustainability. Medina (2008) notes that people who work in the informal waste sector are often marginalized by society, for example, the physically challenged who find it difficult to find work, women, children, the elderly, migrants, and the unemployed.

Furthermore, many developing countries have high unemployment rates (Medina, 2008). Schenck and Blaauw (2011) note that waste pickers are usually unskilled and have low levels of education. Poor education or a lack of education results in a poverty trap. Gutberlet and Uddin (2017) add that waste picking is most prevalent in low- and medium-income countries.

Most waste picking takes place in urban areas where few jobs are available. Political, economic, social, and cultural factors are many reasons for migration. Migration can take place within a country or between one country and another. People might relocate temporarily and return to their origin after a certain period or permanently. Push and pull factors cause people to migrate. The former are the factors that force people to move, such as poverty, unemployment, and economic instability, while the latter attract people to the new location. The relationship between poverty and inequality has received attention from scholars worldwide. However, Africa remains the most interesting case study due to its unique challenges. A study conducted in Central and North African

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countries concluded that inequality fuels poverty in African countries (Ncube et al., 2014). The World Bank (2017) states that "poverty is pronounced deprivation in wellbeing," while inequality refers to the "distribution of attributes, such as income or consumption, across the whole population." Command of commodities and the income that these generate for consumption is central to the definition of well-being and poverty. Thus, the relationship between poverty and inequality is positive, with the former being influenced by the latter. It is also important to note that households should have sufficient income or consumption to put them above some adequate minimum threshold. It is referred to as the poverty datum line.

According to the World Bank (2017), globally, the majority of those who live in poverty are based in rural areas, have low levels of education, work in the agricultural sector, and are below the age of 18. According to Rahman et al. (2017), the informal recycling sector positively impacts the national economy by creating jobs and encouraging small business initiatives. Mismanagement of waste in big cities poses health risks and has adverse economic and environmental consequences (Rahman et al., 2017). Rahman et al. (2017) suggest that educating waste pickers will improve their well-being and that of the environment and encourage them to form cooperatives and associations that empower them. The authors add that well-organized and state-assisted waste-picking activities can be a viable alternative for poverty alleviation within the urban population. As poverty eradication is one of the goals of governments in developing countries, it is incumbent on them to establish programs to empower informal waste pickers. Chikarmane (2012) notes that poverty and inequality are the primary factors that cause people to resort to waste picking. Chikarmane (2012) adds that no one should go through other people's waste to survive and notes that waste pickers are often poorly treated because of the stigma attached to their work. For this reason, the waste pickers of Pune in India organized themselves and marched for their rights and to be treated fairly (Chikarmane, 2012). Furthermore, Chikarmane (2012) notes that waste pickers perform an essential service as they recover recyclable material, reduce municipal solid waste handling costs, generate employment, contribute to public health, and help to protect the environment.

Scavenging is forbidden in developed countries with enough resources to manage waste (Afon, 2012). In contrast, many developing countries need sound solid waste management systems. In such situations, informal waste management should be integrated with formal waste management for economic, social, and environmental effectiveness (Afon, 2012). According to Afon (2012), scavenging enables valuable material to be retrieved from solid waste and recycled and reused. As populations proliferate and economies develop, the volume of waste generated also increases, raising management and environmental issues (Yang et al., 2017). When the formal sector fails, the informal sector steps. However, Yang et al. (2017) argue that the recycling methods employed cause environmental pollution and health problems.

Yigit (2015) notes that waste pickers benefit themselves, their communities, and local government. Ma et al. (2017) note, "In many countries, the informal sector is regarded as undesirable and often a nuisance despite the services it provides." Viljoen et al. (2016) observe that joblessness and a lack of relevant skills and knowledge drive people into the informal economy. Furthermore, there are no barriers to entry into this sector as it is unregulated and untaxed (Viljoen et al., 2016). However, street waste pickers must make more to sustain themselves and are stuck in chronic poverty. Schenck and Blaauw (2011) note they must earn more to send remittances home. Waste pickers' income is determined by the hours they spend at work and the quantity of the recyclable material they recover (Viljoen et al., 2016). Viljoen et al. (2016) suggest that the local government, closest to the people, should organize places where street waste pickers can conduct their business.

Even though street waste pickers play an essential role in reducing waste in landfills, they often suffer victimization (Peres, 2016) due to their outward appearance. Waste pickers are often

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marginalized and looked down upon (Viljoen, 2014; Medina, 2008; Sarkar, 2003). Poverty is not only about money but also about being excluded or isolated from society. However, they note that they are not involved in criminal activities (Peres, 2016). In South Africa, perceptions of waste pickers are often based on assumptions and exaggerations and vary from place to place (Peres, 2016). In Cape Town, collaboration between informal and formal waste management through public-private partnerships would go a long way in addressing this situation (Hachimoto & Sathe, 2015).

Medina (2008) suggests that formalization spearheaded by the government could empower waste pickers, create job opportunities, reduce poverty, save municipalities money, improve industrial competitiveness, conserve natural resources, and protect the environment. The author notes that "three models have been used to organize waste pickers: microenterprises, cooperatives, and public-private partnerships (the integration of public and private sectors). When well managed, these three models can lead to more efficient recycling and be more effective in poverty reduction" (Medina, 2008).

Although many believe that the rising number of waste pickers worldwide indicates increased poverty, Madsen (2005) states that their positive contribution to economic growth and environmental sustainability has yet to be recognized. Sarkar (2003) notes that, regardless of government programs, projects, and policies that aim to alleviate poverty in developing countries, the number of jobless continues to escalate. Indeed, one might argue that unemployment and poverty will always be a problem in such countries. Hence, many jobless turn to unregistered businesses for survival, with waste picking being one of them (Sarkar, 2003). However, as Sarkar (2003) asserts, waste pickers might survive. However, their working conditions are inhumane: "Waste pickers receive meager economic returns and are victims of harassment from the police, municipal workers, and the general population" (Sarkar, 2003). Waste picking goes some way towards addressing climate change, with positive impacts on environmental sustainability (Forrest & Tuwizana, 2012). Recycling prevents more trees from being cut down to produce paper and cardboard and reduces air pollution from burning waste. Given that sustainable development is of significant concern, especially in developing countries, waste pickers' positive role should be recognized by government and other stakeholders.

Countries like Brazil and India have adopted policies to accommodate waste pickers and cooperatives. In contrast, in Sudan, waste pickers still need to be registered and remain on the margins of society. Michael's (2013) report for the United Nations Environment Programme notes that as a result of not being formally recognized, waste pickers are victims of public abuse. Some countries are turning rubbish into riches. For example, in Nakuru, Kenya, most of the urban population earns an income through waste picking (Njoroge et al., 2018). However, Njoroge et al. (2018) add that they work under harsh conditions and often suffer injuries.

While scavenging is considered taboo and illegal in some countries, Aljaradin et al. (2015) note that it has been recognized as a helpful activity in Jordan that contributes to waste reduction and material recovery and has reduced the cost of formal waste management as the volume of waste has decreased. Aljaradin et al. (2015) add that while more people are attracted to this activity, the authorities often ignore scavengers and are exposed to health hazards. Thus, The authors argue for integrating informal waste picking with the formal waste sector.

The impact of waste picking on health does not only concern the individual but the community at large. Households, complexes, industries, and hospitals dispose of soiled disposable baby napkins, dirty sanitary towels, and syringes. Waste pickers are often seen searching bins with bare hands and standing barefoot on heaps of waste (Sarkar, 2003). They risk being cut by broken glass and rusted metal and are exposed to infectious diseases. Cardozo and Moreira (2015) note that the hazardous conditions in which waste pickers work are often the result of poor planning and

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mismanagement of waste disposal. Waste pickers are exposed to worms, intestinal infections, influenza, leptospirosis, dengue, meningitis, headache, fever, allergy, malaise, loss of appetite, nausea, and vomiting (Cardozo & Moreira, 2015). Afon's (2012) study in Olusosun, Nigeria, found that waste pickers suffered from insect bites, malaria, wounds from sharp objects, burns from hot ashes, and falling from moving vehicles. The environmental degradation caused by poor waste management that leads to climate change also has deleterious effects on human health (Parveen & Faisal, 2006). In Brazil, an abundance of waste is generated that contains hazardous toxic elements. Gutberlet and Uddin (2017) noted that waste pickers often lack knowledge of proper waste handling, posing health risks to vulnerable groups such as women and children. Thus, they must receive training on personal hygiene and protecting themselves from the risks associated with their occupation (Rahman et al., 2017). Yang et al. (2017) argue that poor regulation of recycling activities or lack thereof and the use of primitive recycling methods cause environmental and health hazards with wider socioeconomic and environmental consequences.

Waste pickers' jobs also involve physical strain as they bend, carry, and push heavy loads (Suliman, 2011). It could have long-term health implications. Michael (2013) notes that they are exposed to smoke, toxins, and chemicals and risk contracting HIV. Some waste pickers have been killed at landfills by moving vehicles. They also suffer abuse from municipal workers and members of the public. For example, Suliman (2011) notes that waste pickers in Johannesburg are sworn at and verbally abused by the drivers of municipal rubbish trucks for getting in their way. In conflict-ridden countries like Sudan, waste pickers are at risk of picking up explosives (Michael, 2013). Gutberlet and Uddin (2017) observe that waste poses risks to all living organisms when left unattended and poorly managed.

METHODS

The research design is the researcher's plan or approach to obtain the information required to investigate the phenomenon under study. This study adopted a quantitative approach in the form of a survey. A quantitative approach measures variables and generalizes the results to the entire population. The quantitative research approach falls within the positivist paradigm (Creswell, 2013). Creswell states that it involves correlation analysis and descriptive and inferential statistical analysis. This approach is less subjective than a qualitative approach. A quantitative approach was used in related studies such as Akinbola et al. (2015), Kareem (2015), and Rigasa et al. (2016). However, Rigasa et al. (2016) used a mixed methods approach that included questionnaires and interviews. Creswell (2013) adds that a quantitative approach enables the researcher to determine dependent and independent variables. The study population comprised waste pickers from Mayville, Cato Manor, and Westville in Durban. Simple random sampling was used to select the sample. As noted previously, waste pickers are usually found near complexes in Durban. Waste pickers in Mayville, Westville, and Cato Manor were selected. The researcher lives in the same area, and these suburbs were convenient for research purposes. One hundred and twenty waste pickers were targeted; however, 81 were surveyed using a questionnaire. These waste pickers are often seen along the road with their wares, where mediators come in their trucks to buy. Care and diligence were taken when approaching them to avoid conflict and unnecessary exposure to potential crime areas.

A survey questionnaire was used to collect data from the participants. A survey is a quantitative data collection instrument that enables the researcher to gather data for correlation analysis and descriptive statistics (Rigasa et al., 2016). The first section gathered biographical information to establish the participants' background. The second section was structured into five themes informed by the research objectives. Closed-ended questions were posed.

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The questionnaires were coded and captured onto an Excel spreadsheet. Each questionnaire was given a number and captured accordingly. Coding was done using the Likert scale of 1-5 where necessary. Once the data was captured in Excel, it was exported to SPSS version 25 for analysis. The analysis included using descriptive statistics such as mean, mode, and frequency and inferential statistics such as standard deviation. The statistical significance of the correlations, as depicted by cross-tabulations, was also considered when discussing the data and findings. Such analysis is supported by studies such as Akinbola et al. (2015) and Kareem (2015), which used correlations and descriptive statistics. Data validity was confirmed using Cronbach's alpha.

RESULT AND DISCUSSION

The findings revealed that the respondents' ages ranged between 23 and 74, with an average of 47 and a standard deviation of 13.878. The fact that the researcher encountered a waste picker aged 74 reflects the poverty levels in South Africa as in other countries. Depending on their circumstances, this person would receive a state or private pension. The finding that young people are also engaged in waste picking reflects the broader problem of a lack of education and skills and the high unemployment rate among South Africa's youth. Statistics show that 38.4% of the youth in the country survive on less than the median 50% income threshold (Stats SA, 2017).

Sixty-five percent of the waste pickers participating in the study are female, and 35% are male. Some respondents stated that they are widows and have no other means of survival. This finding aligns with Yang et al.'s (2017) observation that while male waste pickers are often more visible, most are women. Madsen (2005) notes that it is essential to investigate the role that gender plays in development. As women are among the most vulnerable groups in society due to gender inequality, ways must be found to empower them in the waste-picking business.

Thirty-two percent of the respondents were single, 13% were married, 6% were divorced, 38% had never married, and 11% were widowed, with an average of 2.83 and a standard deviation of 1.489. Thus, the majority of the respondents had never married and were single. Some stated they had no partners and confronted many challenges as single parents; they added that waste picking is better than prostitution.

Quality of Life. The quality of life of waste pickers was measured in terms of their economic status, considering unemployment, their income per week, the type of settlement they live in, access to running water, and the social dynamics of waste pickers. The study found that, at 74%, unemployment was the leading factor that pushed the respondents into waste picking. Four percent cited retrenchment, 11% pointed to poverty, while 2% said that waste picking is a business for them. Nine percent said there was only one option other than waste picking. It concurs with Medina (2008) and Viljoen et al. (2016) observation that poverty in developing countries pushes people into waste picking, with a source of income as the pull factor.

Mhosisi (2006) also noted that more people are employed in the informal sector than in the formal sector in these economies. The findings indicated that waste picking is the sole source of income for 60% of the respondents. Mhosisi (2006) also noted that many urban dwellers rely on waste picking to survive. Various social grants are available from the government in South Africa, and the proportion of households receiving grants increased from 23.5% in 1993 to 68% in 2014 to reach 11 million (Stats South Africa, 2017). However, most respondents indicated they are not eligible for grants as they need identity documents.

The study found that 70% of the respondents work on their own. Yang et al. (2017) also noted that waste pickers generally work alone or with partners, although some have formed cooperatives to pool their resources. While a few respondents stated that they work with family or friends, conflict is a feature of this business as people compete for waste material. Furthermore, people might work

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alone because they are migrants who do not live with their families. Rifat et al. (2016) note that migration is another factor that pushes people into waste picking as migrants generally do not find jobs in the formal sector. Furthermore, those needing more documentation may have no option but to resort to waste picking to survive.

Household income should be above the minimum threshold of the poverty datum line. The study found that the respondents' income ranged from R250 to R2 000 per week, with an average of R670.25 and a standard deviation of 314.455. Schenck (2017) found that waste pickers earn between R290 and R770 per week, less than that reported by the respondents in the current study. The study revealed that 55% of the respondents were shack dwellers (umkhukhu), while 14% stayed in flats and 32% in Reconstruction and Development Programme (RDP) houses, with a standard deviation of 0.650. It suggests that their basic needs still need to be met. Chapter 2, section 27(1) of the Constitution of the Republic of South Africa states that every citizen has the right to essential services. Madsen (2005) noted that many waste pickers need housing, land, and water access.

Access to Running Water. Fifty-six percent of the respondents strongly disagreed that they had access to running or tap water, while 7% disagreed. Only 28% agreed that they enjoyed such access, and 9% strongly agreed, with an average of 2.26% and a standard deviation of 1.554. Thus, most of the respondents are not enjoying the rights conferred on them by the Constitution. Given the lack of running water, 16% of the respondents and 54% strongly agreed to use water from a nearby river to process their recyclable material. Twenty-three percent strongly disagreed with this statement, 6% disagreed, and 1% remained neutral. Waste pickers use water to add weight to their material. Twenty percent of the respondents strongly disagreed that they engaged in this practice, while 1% disagreed, 23% agreed, and 55% strongly agreed that they add water to increase weight.

Children's School Attendance. Sixty percent of the respondents had school-going children, and 40% reported that their children did not attend school. The high proportion of children not in school is cause for concern. As noted by other scholars, children also engage in waste picking (Viljoen et al., 2015).

Place of Residence. Of the three study locations, 70% of the respondents resided in Mayville, 15% in Cato Manor, and 16% in Westville. The first two areas are home to mainly poor people, while Westville is a low- and middle-class area. Half (50%) of the respondents strongly agreed that their material had been stolen on previous occasions, while 5% agreed, 34% strongly disagreed, and 1% disagreed with this statement. The average is 3.45%, and the standard deviation is 1.834. Rifat et al. (2016) noted that waste pickers often sell their wares daily to avoid theft due to the lack of storage facilities. Furthermore, 80% of the respondents strongly agreed they had been involved in conflict over recyclable material. In comparison, 5% agreed, 12% strongly disagreed, 1% disagreed with this statement, and 1% remained neutral, with an average of 4.4% and a standard deviation of 1.350.

Ninety-three percent of the respondents strongly agreed that they needed an organized shelter to sell their materials, 5% agreed, and only 2% strongly disagreed. Integrating informal recycling into the formal waste management system would assist in addressing this need (Wilson et al., 2006; Yang et al., 2017).

The majority (70%) of the respondents agreed that there is intense competition for recyclable material around the neighborhood, and 30% disagreed, with an average of 4.71 and a standard deviation of 0.458. Such competition causes the conflict discussed above. Finally, 88% of the respondents believed they did not receive a fair price for their wares, with an average of 1.45 and a standard deviation of 0.877.

Ninety-seven percent of the respondents agreed that establishing cooperatives would benefit them as they would represent them and fight for their rights. The average was 4.57, and the standard deviation was .738. It is one of the models proposed by Medina (2008) to organize waste pickers.

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Rigasa et al. (2016) also concluded that forming cooperatives could empower waste pickers and improve their income. Binion and Gutberlet (2012) note that establishing cooperatives has enabled recyclers to legalize and formalize their employment, participate in decision-making, and assert their rights (Binion & Gutberlet, 2012). It also gives them access to legal protection and health care. However, 70% of the respondents in the current study stated that they did not belong to any organization, with an average of 1.4% and a standard deviation of 0.735.

National waste pickers' movements have been established in Kenya and South Africa, and cooperatives have been formed and have contracted with municipalities to perform aspects of solid waste management. In some cases, community-based approaches to solid waste management have been developed (Rigasa et al., 2016). However, the respondents needed to be made aware of such cooperatives in Durban.

Places Where Waste Pickers Sell Their Wares. Seventy-five percent of respondents indicated they sell their material on the roadside, where mediators come with trucks to buy recyclable material. It points to the need for an organized marketplace due to the informality of waste picking. This finding aligns with that of Downs and Medina (2000), that waste picking is a highly informal business.

Effects of Weather on Waste Picking Activities. Ninety-two percent of the respondents agreed that business is prolonged during the rainy season as they have no secure place to work and store their wares. There is no shelter on the roads, dump sites, or landfills. Only 2% of the respondents disagreed with this statement, and 7% indicated that business is expected during the rainy season.

The waste pickers' age and weekly income are positively related, albeit at a very low correlation coefficient of 0.081. This relationship is, however, statistically insignificant, with a p-value of 0.488. Age does not influence waste pickers' earnings. Blauuw et al. (2015) and Viljoen (2016) conclude that waste pickers determine their income, as the more hours and effort they put in, the more they earn.

Gender and Waste Pickers with School-Going Children. Eighty percent of the respondents who lived with school-going children were female, with males at 20%. The relationship between gender and the waste pickers that stay with school-going children is statically significant with a Chi-Square of 0.005. Women are primarily responsible for caring for children, especially in Africa. It confirms Mhosisi's (2006) finding that waste pickers use their income to support their school-going children. It points to the female waste pickers' sense of responsibility and the need for programs to empower them.

Seventy-three percent of the respondents who lived in flats were male, and 27% were female. In contrast, 70% of respondents who reported staying in a shack were female, and 30% were male. The relationship between gender and type of settlement is statistically significant, with a Chi-Square of 0.016. It suggests that male waste pickers are likelier than their female counterparts to live in formal settlements.

Gender and Sources of Income. The study found that 42.2% of the male respondents had no income other than from waste picking, while 55% of the female respondents received government grants. According to Hundenborn et al. (2016), social grants accounted for 4.6% of household income in 1993 compared to 6.1% in 2014. Hence, there is a relationship between gender and the source of income with a Chi-Square of 0.003. Some male respondents stated that it is embarrassing to be seen standing in a queue to apply for or receive a grant.

Gender and Competition for Recyclable Material. Both the male and female respondents overwhelmingly agreed that there is intense competition for recyclable material in their neighborhood. However, the relationship is statistically insignificant, with a Chi-Square of 0.114. As

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noted earlier, competition results in conflict. The findings showed that female waste pickers were more likely to be involved in such conflict. However, the relationship is statistically insignificant, with a Chi-Square of 0.292. It means gender does not determine who fights over waste material. Sixty-one percent of the respondents indicated that they preferred to work alone were female, and 39% were male. However, the relationship is statistically insignificant, with a Chi-Square of 0.682. Nonetheless, it confirms intense competition and that more women prefer to work alone.

Gender and the Effects of Weather Patterns. Sixty-six percent of respondents agreed that business is slow during the rainy season were women, and 34% were male. It could be because fewer men than women participated in the study. The relationship between gender and how rain affects business is statistically insignificant, with a Chi-Square of 0.772.

Awareness of the risks of waste picking activities and measures waste pickers adopt to protect their health. The study found that 46% of the participants strongly disagreed that they knew the health implications of waste-picking activities. In comparison, 5% disagreed, 9% were neutral, 20% agreed, and 16% strongly agreed that they were aware of the health implications associated with this business, at an average of 2.64% and a standard deviation of 1.690. The fact that a sizeable proportion of the respondents needed to be made aware of the hazards associated with waste picking concurs with Gutbelert and Uddin (2017), who asserted that most waste pickers lack adequate knowledge when handling waste.

Furthermore, 50% of the respondents strongly disagreed that they had previously contracted diseases due to waste-picking activities, and 5% disagreed. None of the respondents remained neutral on this issue; and 4% agreed, and 40% strongly agreed that they had previously contracted diseases due to this activity. The mean was 2.82, and the standard deviation was 1.938. Cardozo and Moreira (2015) noted that waste picking exposes pickers to diseases, insect bites, and worms. Regarding the use of protective equipment, only 14% of the respondents strongly disagreed that they use protective equipment when collecting recyclable material, with 5% remaining neutral, 35% agreeing, and 46% strongly agreeing, with an average of 4.01 and a standard deviation of 1.938. Most stated that they use plastic to protect themselves and mud to prevent sunburn.

Finally, 10% of the respondents strongly disagreed that they put the excess back in the bins after selecting the material they use, while 10% disagreed, 4% agreed, and 66% strongly agreed with this statement. The average was 4.16%, and the standard deviation was 1.400. Putting rubbish back in the bins sustains the environment. Yang et al. (2017) argue that informal recycling often leads to environmental and health problems. However, emerging evidence shows this is only sometimes the case, as waste pickers positively impact waste organizations.

Gender and Awareness of Health Hazards. Both female and male respondents indicated that they knew the health hazards of waste picking. Of those who concurred with this statement, 49% were male and 51% female. However, the relationship between gender and health hazard awareness is statistically insignificant, with a Chi-Square value of 0.197. It is not surprising for waste pickers to have a lack of knowledge regarding health hazards due to their generally low level of education. Awareness campaigns are thus required to educate them. Gutberlet and Uddin (2017) observe that insufficient awareness of waste handling risks constitutes a health hazard.

CONCLUSION

The study aimed to unpack waste pickers' health and socioeconomic status in Mayville, Cato Manor, and Westville in Durban. The study was founded on three objectives, which were to analyze the quality of life of waste pickers in terms of their economic and social status, assess waste pickers' awareness of the risks associated with this kind of work as far as their health is concerned; and to establish the extent of their uptake of protective measures. Regarding the first objective, it was found

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that unemployment is the primary factor that pushed the respondents into waste picking. Waste pickers were found to entirely depend on this activity as far as their employment is concerned. 74% of waste pickers were unemployed and earned their income through waste picking. In a week, it was found that waste pickers earn between R20 and R2000 at an average of R670.25. However, their average income could be higher, and waste picking is their only source of income for many. It was also found that most of the respondents lived in shacks. Many needed access to running/tap water and used water from a nearby river to process their material. In terms of social dynamics, it was found that there is intense competition for waste material and that this often results in conflict and a preference for working solo. Forming cooperatives could address these challenges. The study found that most waste pickers sold their material on the roadside to mediators, and business is prolonged during the rainy season. Given the paucity of research in this area, further studies are recommended. Qualitative studies would add insight to the findings of this quantitative study.

REFERENCES

Afon, A. (2012). A Survey of Operational Characteristics of Socioeconomic and Health Effects of Scavenging Activity in Lagos. *Waste Management & Research 30*(7) 664–671. https://doi.org/10.1177/0734242X12444894

Akinbola, O. A., Ojo, O. A. & Hakeem, A. A. (2015). Role of Waste Management in Wealth Creation in Nigeria-Evidences from Lagos State Waste Management Authority (LAWMA). *IFE PsychologIA: An International Journal, 23*(1), pp.120-130.

Aljaradin, M., Persson, K. M., & Sood, E. (2015). The Role of Informal Sector in Waste Management, A Case Study; Tafila-Jordan. *Resources and Environment, 5*(1), 9-14.

Alversia, Y. (2011). Doing quantitative research in education with SPSS. https://doi.org/10.1080/09500790.2011.596379

Binion, E. & Gutberlet, J., (2012). The Effects of Handling Solid Waste on the Wellbeing of Informal and Organized Recyclers: A Review of the Literature. *International Journal of Occupational and Environmental Health, 18(*1), pp. 43-52. https://doi.org/10.1179/1077352512Z.0000000001

Blaauw, P. F., Viljoen, J. M. M., Schenck, C. J., & Swart, E. C. (2015). To" Spot" and" Point": Managing Waste Pickers' Access to Landfill Waste in the North-West Province. *Africagrowth Agenda, 2015(4),* 18-21.

Bradshaw, T. K. (2007). Theories of Poverty and Anti-Poverty Programs in Community Development. *Community Development, 38(*1), 7–25. https://doi.org/10.1080/15575330709490182

Bradshaw, P. (2013). The Online Journalism Handbook: Skills to Survive and Thrive in the Digital Age. Routledge.

Cardozo, M. C., & Moreira, R. M. (2015). Potential Health Risks of Waste Pickers. *O Mundo da Saúde, 39*(3), 370-376. https://doi.org/10.15343/0104-7809.20153903370376

Chikarmane, P. (2012). Integrating Waste Pickers into Municipal Solid Waste Management in Pune, India. *WIEGO Policy Brief (Urban Policies), 8*, 23.

Creswell, J. W. (2013). Steps in Conducting a Scholarly Mixed Methods Study.

Downs, M. & Medina, M., (2000). A Short History of Scavenging. *Comparative Civilizations Review, 42*(42), 4.

Faisal, K., Parveen, S., Rajendran, R., Girija, R., Periasamy, V. S., Kadalmani, B., ... & Akbarsha, M. A. (2006). Male Reproductive Toxic Effect of Quassia Amara: Observations on Mouse Sperm. *Journal of Endocrinology and Reproduction, 66-69.*

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Indexed By : GARUDA Google dbi ROAD INDEX COPERNICUS OneSearch ISJD sinta 4 EBSCO Clarivate Analytics WEB OF SCIENCE

Fei, F., Qu, L., Wen, Z., Xue, Y., & Zhang, H. (2016). How To Integrate the Informal Recycling System into Municipal Solid Waste Management in Developing Countries: Based on a China's Case in Suzhou Urban Area. Resources, conservation and recycling, 110, 74-86. https://doi.org/10.1016/j.resconrec.2016.03.019

Finn, A., Leibbrandt, M., & Oosthuizen, M. (2014). Poverty, Inequality, and Prices in Post-Apartheid South Africa (No. 2014/127). WIDER Working Paper. https://doi.org/10.35188/UNU-WIDER/2014/848-3

Firdaus, G. & Ahmad, A., (2010). Management of Urban Solid Waste Pollution in Developing Countries. *International Journal of Environmental Research, 4*(4), pp. 795-806.

Forrest, K. & Tuwizana, K., (2012). Tracking Waste Pickers in West Africa. *Women in Informal Employment Globalizing and Organizing, 12*(1), 1–12.

Grant, R. & Oteng-Ababio, M., (2012). Mapping the Invisible and Real "African" Economy: Urban E-Waste Circuitry. *Urban Geography, 33*(1), pp.1-21. https://doi.org/10.2747/0272-3638.33.1.1

Graven, M. H., (2014). Poverty, Inequality and Mathematics Performance: The Case of South Africa's Post-Apartheid Context. *ZDM, 46*(7), pp.1039-1049. https://doi.org/10.1007/s11858-013-0566-7

Gupta, J. & Vegelin, C., (2016). Sustainable Development Goals and Inclusive Development. *International Environmental Agreements: Politics, Law and Economics, 16*(3), 433–448. https://doi.org/10.1007/s10784-016-9323-z

Gutberlet, J., & Uddin, S. M. N. (2017). Household Waste and Health Risks Affecting Waste Pickers and the Environment in Low-And Middle-Income Countries. *International Journal of Occupational and Environmental Health, 23*(4), 299-310. https://doi.org/10.1080/10773525.2018.1484996

Gutberlet, J. (2012). Informal Recycling and Occupational Health in Santo André, Brazil. *International Journal of Environmental Health Research, 18*(1), pp.1-15. https://doi.org/10.1080/09603120701844258

Hadiyanti, P. (2016). A Group Approach in a Community Empowerment: A Case Study of Waste Recycling Group in Jakarta. *Journal of Education and Practice, 7*(29), 157-167.

Hashimoto, Y., & Neha, S. (2015). Waste Management and Public-Private Partnership-Integrating Waste Pickers' Cooperative in India. *Journal of KIBI International University. Humanities and social sciences, (25)*, 103-111.

Harris, J. M. (2000). "Basic principles of sustainable development." Dimensions of Sustainable Development; Seidler, R., Bawa, KS, Eds: 21–41. http://www.worldbank.org/en/topic/poverty/overview National Development Plan. Available at: http://www.poa.gov.za/news/Documents/NPC%20National%20Development%20Plan%20Vision%202030%20-lo-res.pdf Accessed 1 September 2017.

Hundenborn, J., Leibbrandt, M., Woolard, I., (2016). Drivers of Inequality in South Africa. A Southern Africa Labour and Development Research Unit Working Paper Number 194. Cape Town: SALDRU, University of Cape Town

Karani, P. & Jewasikiewitz, S.M., (2007). Waste Management and Sustainable Development in South Africa. *Environment, Development and Sustainability, 9*(2), pp.163-185. https://doi.org/10.1007/s10668-005-9010-7

Kareem, D. M. (2015). *Coverage in Wireless Sensor Networks* (Master's thesis).

Linzner, R. & Salhofer, S., (2014). Municipal Solid Waste Recycling and the Significance of Informal Sector in Urban China. *Waste Management & Research, 32*(9), pp.896-907. https://doi.org/10.1177/0734242X14543555

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Indexed By : GARUDA Google dof Crossref ROAD INDEX COPERNICUS OneSearch ISJD sinta 4 EBSCO Clarivate Analytics WEB OF SCIENCE

Ma, M., Thompson, J. R., & Flower, R. J. (2017). Protect Coastal Wetlands in China to Save Endangered Migratory Birds. *Proceedings of the National Academy of Sciences, 114*(28), E5491-E5492. https://doi.org/10.1073/pnas.1706111114

Madsen, C. A., (2005). Feminizing Waste: Waste-Picking as an Empowerment Opportunity for Women and Children in Impoverished Communities. *Colo. J. Int'l Envtl. L. & Pol'y, 17*, p.165. https://doi.org/10.1034/j.1399-3070.1999.00012.x

Medina M., (2008). The Informal Recycling Factor in Developing Countries, Organising Waste Pickers to Enhance Their Impact. Gridlines; No 44, World Bank, Washington, DC World Bank. Https// Open Knowledge. World bank.org/handle/10986/10586License:CC BY 3.0 IGO".

Michaels, J. H. (2013). Able But Not Willing: A Critical Assessment of NATO's Libya Intervention. In The NATO intervention in Libya (pp. 17–40). Routledge.

Morrill, R. L., & Wohlenberg, E. H. (1971). The Geography of Poverty in the United States. (No Title).

Ncube, M., Anyanwu, J. C., & Hausken, K., (2014). Inequality, Economic Growth and Poverty in the Middle East and North Africa (MENA). *African Development Review, 26*(3), 435- 453. https://doi.org/10.1111/1467-8268.12103

Njoroge, K. S., Wokabi, M. S., Ngetich, K. & Kathuri, N. M., (2013). Influence of Informal Solid Waste Management on Livelihoods of Urban Solid Waste Collectors: A Case Study of Nakuru Municipality, Kenya. *International Journal of Humanities and Social Science, 3*(13), pp. 95-108.

Nzeadibe, T. C., (2009). Solid Waste Reforms and Informal Recycling in Enugu Urban Area, Nigeria. *Habitat International, 33*(1), pp. 93-99. https://doi.org/10.1016/j.habitatint.2008.05.006

Nzeadibe, T. C., Anyadike, R.N. & Njoku-Tony, R.F., (2012). A Mixed Methods Approach to Vulnerability and Quality of Life Assessment of Waste Picking in Urban Nigeria. *Applied Research in Quality of Life, 7*(4), pp.351-370. https://doi.org/10.1007/s11482-012-9171-0

Parihar, R.S., Ahmed, S., Baredar, P. & Sharma, A. (2017). Characterisation and Management of Municipal Solid Waste in Bhopal, Madhya Pradesh, India. In Proceedings of the Institution of Civil Engineers-Waste and Resource Management (Vol. 170, No. 3+ 4, pp. 95-106). Thomas Telford Ltd. https://doi.org/10.1680/jwarm.17.00002

Paul, J. G., Arce-Jaque, J., Ravena, N. & Villamor, S.P., (2012). Integration of the Informal Sector into Municipal Solid Waste Management in the Philippines – What Needs? *Waste Management, 32(*11), pp. 2018-2028. https://doi.org/10.1016/j.wasman.2012.05.026

Peres, T. S., (2016). Stigma Management in Waste Management: An Investigation into the Interactions of 'Waste Pickers' on the Streets of Cape Town and the Consequences for Agency (Doctoral dissertation, University of Cape Town).

Rahman, M. Z., Siwar, C. & Begum, R.A., (2017). Solid Waste Recycling: Sustainability Issues in Dhaka City. *The Journal of Developing Areas, 51*(3), pp. 377-388. https://doi.org/10.1353/jda.2017.0079

Rifat, M. R., Siddique, A., Abouzied, A. & Chen, J., (2016). From Alley to Landfill: Challenges of and Design Opportunities for Cleaning Dhaka's Communal Trash. In Proceedings of the Eighth International Conference on Information and Communication Technologies and Development (p. 9). ACM. https://doi.org/10.1145/2909609.2909648

Rigasa, Y.A., Badamasi, A. G., Galadimawa, N. & Abubakar, G. U. (2016). Community-based solid waste management strategy: A case study of Kaduna metropolis. *WIT Transactions on Ecology and the Environment, 210*, pp.761-772. https://doi.org/10.2495/SDP160641

Sarkar, P., (2003). Solid Waste Management in Delhi – A Social Vulnerability Study. In Proceedings of the Third International Conference on Environment and Health. *Chennai, India* (pp. 15–17).

ISSN 2720 - 9644 (print)
ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By :

Schenck, R. & Blaauw, P. F., (2011). The Work and Lives of Street Waste Pickers in Pretoria – A Case Study of Recycling in South Africa's Urban Informal Economy. *In Urban Forum (Vol. 22*, No. 4, p. 411). Springer Netherlands. https://doi.org/10.1007/s12132-011-9125-x

Spaull, N., (2015). Schooling in South Africa: How low-quality education becomes a poverty trap. *South African Child Gauge, 12,* pp. 34–41.

Statistics South Africa. (2017a). Poverty Trends in South Africa: An Examination of Absolute Poverty Between 2006 and 2015. Available at http://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf Accessed on 02 September 2017.

Suliman, A. (2011). The State of Heart Disease in Sudan. *Cardiovascular Journal of Africa, 22*(4), 191–196. https://doi.org/10.5830/CVJA-2010-054

Timæus, I. M., Simelane, S., & Letsoalo, T. (2013). Poverty, Race, and Children's Progress at School in South Africa. *The journal of development studies, 49*(2), 270-284. https://doi.org/10.1080/00220388.2012.693168

Torun, A. A., Yazici, A., Erdem, H., & ÇAKMAK, İ. (2006). Genotypic Variation in Tolerance to Boron Toxicity in 70 Durum Wheat Genotypes. *Turkish Journal of Agriculture and Forestry, 30*(1), 49-58.

Van Zeeland, A. J., (2014). The Interaction Between Popular Economy, Social Movements and Public Policies: A Case Study of The Waste Pickers' Movement (No. 11). UNRISD Occasional Paper: Potential and Limits of Social and Solidarity Economy.

Viljoen, J. M. M. (2014). Economic and Social Aspects of Street Waste Pickers in South Africa (Doctoral Dissertation, University of Johannesburg).

Viljoen, J. M. M., Blaauw, P. F. & Schenck, C.J. (2016). Sometimes, you need to make more to Buy Food. An Analysis of South African Street Waste Pickers' Income, ERSA Working Paper, 603, p. 603.

Viljoen, K., Blaauw, P. & Schenck, R. (2016). " I Would Rather Have a Decent Job": Potential Barriers Preventing Street-Waste Pickers from Improving Their Socioeconomic Conditions. *South African Journal of Economic and Management Sciences, 19*(2), pp.175-191. https://doi.org/10.4102/sajems.v19i2.1258

Wilson, D. C., Velis, C. & Cheeseman, C., (2006). Role of Informal Sector Recycling in Waste Management in Developing Countries. *Habitat International, 30*(4), 797–808. https://doi.org/10.1016/j.habitatint.2005.09.005

World Bank Group Handbook. Available at http://siteresources.worldbank.org/INTPA/Resources/429966-1259774805724/Poverty_Inequality_Handbook_Ch01.pdf

Yaacob, N. D., Ismail, H. & Ting, S. S. (2016). Soil Burial of Polylactic Acid/Paddy Straw Powder Biocomposite. *BioResources, 11*(1), 1255–1269. https://doi.org/10.15376/biores.11.1.1255-1269

Yang, H., Ma, M., Thompson, J. R. & Flower, R. J. (2018). Waste Management, Informal Recycling, Environmental Pollution and Public Health. *J Epidemiol Community Health, 72*(3), pp.237–243. https://doi.org/10.1136/jech-2016-208597

Yigit, I. H., (2015). Survival Tactics of Waste Paper Pickers in Istanbul. *Journal of Ethnic and Cultural Studies,* 2(1), pp.1-14. https://doi.org/10.29333/ejecs/20